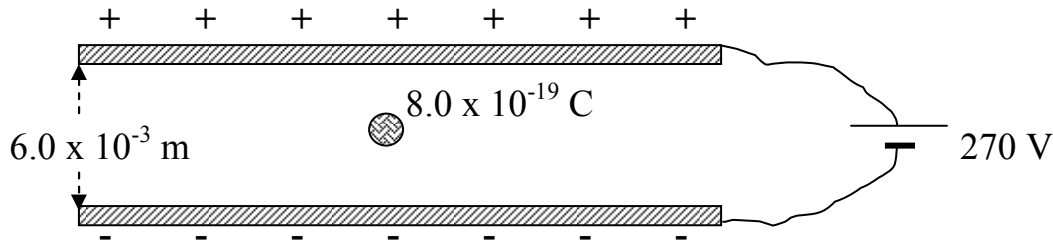


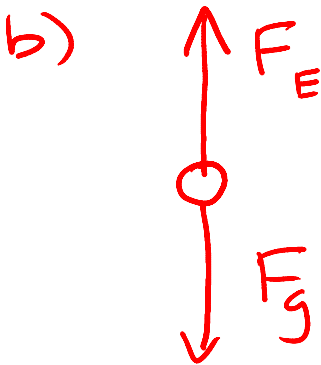
Example 13. A charged particle of $8.0 \times 10^{-19} \text{ C}$ is held stationary inside an electric field produced by two electric plates. The voltage between the plates is 270 V and they are separated by a distance of $6.0 \times 10^{-3} \text{ m}$.



- What constant electric field strength exists between the plates?
- What is the mass of the particle? Hint: first draw a f.b.d. of the particle to determine its weight.

$$a) \quad E = \frac{\Delta V}{d} = \frac{270}{6.0 \times 10^{-3}}$$

$$E = 45000 \text{ N/C}$$



\Rightarrow particle is stationary,

so

$$F_g = F_E$$

continued on next page . . .

→ since $F_E = qE$

then $F_g = F_E = (8 \times 10^{-19})(45000)$
 $= 3.6 \times 10^{-14} \text{ N}$

Since $F_g = mg$,

$$m = \frac{3.6 \times 10^{-14}}{9.8}$$

$$m = 3.7 \times 10^{-15} \text{ kg}$$